

# COMPUTERWORLD

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## Software & Maintenance Attacked

# Leasing Firm Wants U.S. Court To Divide IBM Into Four Parts

By Peter L. Briggs

**NEW YORK**—In its antitrust and tort suit against IBM, Data Processing Financial & General has brought several new areas of IBM's business practices into the legal spotlight.

The suit, filed in federal court here Jan. 3, raises the issue of IBM's maintenance and software practices, and their effect on DPFG as a purchaser and lessor of IBM equipment. Involved is price "bundling" under which the cost of separate services and products are offered under a single contract and for a single price.

IBM has denied that it violated the antitrust laws and has stated that "DPFG's allegations are completely

without merit." It further stated that it intended to "vigorously" defend itself against such allegations.

### Relief Sought

DPFG claims actual damages of \$351,500,000 and asks for twice this amount (\$703,000,000) as antitrust penalty, a total of \$1,054,500,000. The firm also asks for \$1 billion in exemplary and punitive damages.

DPFG also has asked the court to separate IBM into four competitive entities: IBM, the Leasing Corp., the Maintenance Corp., and the Software Corp.

### Subsequent Users Policy

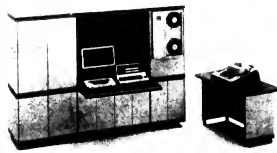
The leasing company particularly charges that it has

been damaged by IBM's policy toward "subsequent users" of IBM equipment.

According to the complaint, when a computer is physically moved or its main work load is changed, and the computer does not belong to IBM, IBM stops all software, educational, maintenance, and service support. This, DPFG contends, prevents it from leasing systems to the federal government because the government is aware of this policy and does not wish to lose system support.

### Difference From CIO Suit

The basic difference between the Control Data suit (continued on Page 11).



The FR 80 Microfilm Recorder can serve as a 20,000-line-per-minute on-line or off-line printer.

## Microfilm Recorder Can Print At Speeds Up to 20,000 L/M

**LOS ANGELES**—A device capable of performing as an off-line high-speed printer at up to 20,000 lines per minute has been announced by Information International.

The device, called the FR 80, is a fast microfilm recorder which offers resolution four times more precise than that now available, according to the company. The unit competes with high-speed printers and digital plotters as an off-line computer output device with a higher speed and a lower price per page, according to a company spokesman. The device has a resolution of 16,384 by 16,384 programmable points, better than or equal to that of a 4" by 4" flat-bed plotter. The unit can print at up to 20,000 lines per minute, about 10 times the speed of a typical IBM 360 using three magnetic tapes and two 1100-line-per-minute printers.

### Tape Format

The FR 80 accepts tapes for-

matted for the IBM 360 and 1401 line printers, the Stromberg Datagraph, 4020, 4060 and 4080, and for the Calt-comp line of plotters.

The system is really a computer system with its own memory, programming software, and device controls. The software supplied supports all the above applications without difficulty and can be expanded to handle typesetting, animated films, and data retrieval systems, according

to Alfred I. Knauer, company president.

### 64 Character Sizes

In addition to the more than 300 million addressable points per frame, the unit includes eight programmable line widths and eight programmable spot intensities, according to the company. It has several character styles, and a choice of 64 programmable character sizes. 8 pro-

(continued on Page 7)

## Government Offers a Free File Manipulation Package

**WASHINGTON, D.C.**—A free general-purpose file-manipulation program has been released by the Office of Standard Reference Data (National Bureau of Standards).

The program is described in Technical Note No. 444, which provides listings of the Fortran source language as well as a detailed description of the program's functions.

Known as Reform, the program provides tools for manipulating fixed-length and fixed-format records, inserting, strings, fragmenting records, and rearranging fragments into any desired sequence.

The program operates through the use of control characters on control cards and provides complete flexibility in data manipulation. Provision is made for adding up to 26 arbitrary character strings, each of which may be

79 characters in length thus heads the user to insert labels, omissions, or comments into the file.

The program is written in ASA

Standard Fortran, providing excellent intermachine compatibility. The published version runs on the Univac 1108 computer, but can be taken to minimize the changes necessary to run the program on other computer systems.

Six types of control cards are used to allow specification of input and output. The control cards are followed by the data. The program can accept card or tape input and can produce either print tapes, printed cards, or punched cards.

According to a source in the bureau, this program is a continuation of an attempt to promote user communication and compatibility through the use of standardized programs. This also reduces the amount of repetitive programming needed among different installations. There are other programs in the series available from the office, and the bureau hopes to release another version of this program which will accept variable data formats.

## PDP-12 Can Handle Both Scientific, Business Jobs

By a CIO Staff Writer

**MAYNARD, Mass.**—A new laboratory-oriented computer system, the PDP-12, which also can handle business applications, has been announced by Digital Equipment Corp.

The new system a descendant of the 1-in (Laboratory Instrumentation Computer) system developed about three years ago, provides full on-line data analysis capabilities, with displays, direct data channels, and up to a 32K memory.

The system provides, as subsets of its instruction set, the full capability of a PDP's and an analog-to-digital converter.

### Many Uses Seen

Simplicity of operation, ease of programming, and a high degree of reliability at reasonable prices are the principle advantages of the new system, a company spokesman said. Potential applications include medicine, oceanography, chemistry, physics, and education. "The system

can be put to almost any use a purchaser might desire," according to PDP-12 marketing manager Edward Kramer.

Bio-medical computer systems have long been a specialty of the company, according to Kramer, so this is merely an expansion into the market "With about 1,000 hospitals worldwide, there is a huge market for the PDP-12," he said.

### Buffered Tape Drives

The system makes use of fully integrated circuits, eliminating the cumbersome dual-processor system required by the Linc's, its predecessor. The system operates at several times the speed of its predecessor, and requires less memory without the processor-to-processor interface. Two fully buffered tape drives are incorporated directly into the processor providing extensive program storage and data storage space.

"About 90% of the data col-

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**Applications**

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## DIRECTOR OF DATA PROCESSING SALES

Article of one of the nation's top corporations is establishing a computer services division which will specialize in data processing for the life insurance industry. We have completed our market research phase and are ready to go to market. If you have at least 3 years in computer hardware or software sales, you could be the man for us. If you also have a knowledge of life insurance data processing, you probably are the man for us. And if you must develop marketing strategy and applying it, you are the man for us. Excellent salary, commissions, and benefits. Please send resume, including earnings history to:

Donald H. Rose, Assistant Vice President  
Kendall American Company Inc.  
The Life and Health Insurance Company  
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312 782 9636

## 360'S FOR SALE AND WANTED

IPS has for sale the following 360 equipment: 360/40 131K with 3 tapes, 5 2311's for April, 1969 delivery; 360/30 65K CPU for March, 1969; a 2821 I control unit for March, 1969; 4 2311's and 2 2841's for March, 1969. We are looking for a 360/65 512K system, a 360/50 256K system, a 360/30 65K tape/disc system for summer, 1969; 360/30 32K 2311 disc system, and a 360/30 8K 16K tape system with 1401 emulation. Please note IPS handles only purchased equipment. For prices or additional information, please call or write:

**IPS**

INFORMATION PROCESSING SYSTEMS, INC.

200 WEST 57TH STREET NEW YORK, N.Y. 10019 (212) 246-2267

## Computer Companion

#784



RENTAL: 1 Year \$1000, 2 Year \$1800, 3 Year \$2500, 4 Year \$3200, 5 Year \$3800, 6 Year \$4500, 7 Year \$5200, 8 Year \$5800, 9 Year \$6500, 10 Year \$7200, 11 Year \$7800, 12 Year \$8500, 13 Year \$9200, 14 Year \$9800, 15 Year \$10500, 16 Year \$11200, 17 Year \$11800, 18 Year \$12500, 19 Year \$13200, 20 Year \$13800, 21 Year \$14500, 22 Year \$15200, 23 Year \$15800, 24 Year \$16500, 25 Year \$17200, 26 Year \$17800, 27 Year \$18500, 28 Year \$19200, 29 Year \$19800, 30 Year \$20500, 31 Year \$21200, 32 Year \$21800, 33 Year \$22500, 34 Year \$23200, 35 Year \$23800, 36 Year \$24500, 37 Year \$25200, 38 Year \$25800, 39 Year \$26500, 40 Year \$27200, 41 Year \$27800, 42 Year \$28500, 43 Year \$29200, 44 Year \$29800, 45 Year \$30500, 46 Year \$31200, 47 Year \$31800, 48 Year \$32500, 49 Year \$33200, 50 Year \$33800, 51 Year \$34500, 52 Year \$35200, 53 Year \$35800, 54 Year \$36500, 55 Year \$37200, 56 Year \$37800, 57 Year \$38500, 58 Year \$39200, 59 Year \$39800, 60 Year 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## Editorials

## Govt. Software Boon to Users

The announcements, over the last few months, of free programs from various government agencies could represent a tremendous boon to the computer community.

Over the past several years the Office of the Navy and the Office of Standard Reference Data (National Bureau of Standards) have released many programs for different applications. These programs have included standardized data reduction programs, general purpose file manipulation programs for free-format and fixed-format records, and testing programs to evaluate compilers and programs.

The dollar savings of such free programs are mainly in areas where communication between people has become a major problem. With some basic for intelligible and comparable results with different systems, users can communicate with fewer problems. Anything which contributes toward this goal is worthy of praise.

The user can then establish some performance base for his system in comparison with systems made by other manufacturers and running with different system software. This could provide the basis for some industry-wide tools for performance measurement.

## 'Uncompetitive' Competition

Many users are going to be able to reduce their expenses for outside software if the current policy of releasing programs and packages developed under government auspices is continued.

The trend has been toward scientifically oriented programs and systems, but this trend has shown signs of reversing itself. The type of programs currently being released are true general-purpose programs and include such utilities as compilers, monitor systems, and generalized utilities.

Examples of such utilities are Lowbit, Omnitran, and Reform. These languages and utilities are a new form of governmental "uncompetitive" competition. They represent a definite threat to the software houses but, as pointed out above, a potential boon to users.

The software houses will find it more and more difficult to determine where it is safe to invest money for new products. They may find that, since this type of governmental development work goes on at an increasing rate, the market for smaller utilities is completely submerged by the use of these free packages.

This trend could provide some long-term negative effects in that it could reduce the amount of private development work, cut down the amount of competitive software available, and eliminate much of the useful work going on to improve the state of the art. This work is valuable, since it contributes to the continued growth of computers.

It seems somewhat of a shame to turn over another area of enterprise to the federal government, have software development become buried in administrative red tape and reduced to a mere hack operation. Many good people would look for other areas of endeavor if the economic stimulus is removed from the development area.

## Viewpoint

Computer's Educational Role Confused  
By the Lack of Standard Definitions

By Bernard J. Lukin

Cow Consultants Editor

Over the past several years the use of the computer in facilitating the instructional process has become a very controversial and heavily discussed topic. The pedagogical value of the device has been questioned and a good deal of material, much of it confusing, has been published.

Some of the confusion probably generates from lack of definition of the process. Possibly, there is a hierarchy of levels of understanding, similar to those presented by Bloom; i.e., an ordered and definable hierarchy, distinguishable when talking about the integration of the computer into the instructional process.

At this point in the state of the art, I believe we should at least make some attempt at this classification. There is no wrong, of course, in using a number of terms in their generic sense, but when we get down to serious professional planning, a taxonomy seems imperative.

Pointedly, our concern is individualizing the learning process for each student in an optimum way. In doing this we recognize that a spectrum of activities spanning from drill and practice to simulation and more, in the form of individual tutorial interaction with the computer, is possible. There are, however, other distinct applications.

Let us look at the possible hierarchy. Suppose we try to establish an ordered taxonomy of the use of the computer in the learning process in this fashion; i.e., we define and describe and taxonomize terms in the following technical order:

## Computer-Assisted Learning

CAL is the highest level of application of the computer in the learning process. At this stage of development it is the most experimental, the most criticized component, and the area in which the least materials have been developed. CAL involves behavioral change stemming from the direct course/curricular interface of a student with the computer. The "terminal as a tutor" helps to effectively point up the meaning. Simulation and gaming, problem solving (using the computer as a computer), programmed text-type materials, and drill and practice are all part of what we might term CAL.

The broad spectrum of levels within this category is, in itself, a very challenging area of much needed development.

## Computer-Manager Instruction

CMI is composed of the management of learning activities through a multiunitary course/curriculum. In the computer-managed process, the computer has the ability to guide the student, at his choice and pace, through a planned series of alternative learnings. This process can best be described by example.

Suppose an instructor wanted to teach a unit on the Civil War in the next week. He might say to his students, "Go to the Comprehension Center and dial 1-1-3-4-5 to begin your study of the Civil War."

The computer then produces instructions to the learner which indicate (recognizing that individuals learn effectively in different ways and using a different combination of senses) that the student

has, in this case, three alternative choices in exploring the first portion of the unit. The student can (1) check out a taped lecture on the Civil War and listen in a listening carrel; (2) look at a set of prepared slides with accompanying text; or (3) check out a programmed text on this unit. The materials might have been prepared by the instructor or by a team of instructors developing units in this area. The student has the option of using one or all of these materials. He can return periodically and "test" himself on the success of his efforts. The results of his work will, of course, be stored and analyzed.

Before going to class, the instructor could stop by the "Comprehension Center" and pick up an analysis of the student responses to the materials, including analysis of pinpointed weaknesses shown by the students as a group and as individuals, and he could collect questions learners might have had on their minds at the time of their highest interest and involvement, and which they had entered. The technology, pedagogical skill, software, and technical expertise for this type of development and integration of the computer into the learning process is here today.

## Computer-Assisted Instruction

CAL, it seems to me, is simply the use of the computer to assist instruction. This can be done through a broad range of activities such as faculty test scoring, printing of rosters, providing counseling, and other nonadministrative information, in areas supportive of the learning process in course/unit environment. Nonadministrative, ancillary supportive activities might be a way of describing this aspect of the process.

I would not presume to provide succinct, final, and delineating definitions, but I would presume to open the process for discussion, and to provide the information above as a beginning in an attempt to help clarify the use of the computer in the process. The establishment of an understandable and desirable taxonomy is necessary because the type of development, the degree of involvement of staff, and the ability of staff to become involved is dependent on the understanding of each as he becomes initiated into the spectrum and nature of the activities which comprise, generally, all which is included in the broadest and most inclusive of the terminology, computer-assisted instruction.

To summarize, it seems to me that in practice all of the terms are used generically, but for those who plan involvement, development, and experimentation, an ordered taxonomy is necessary.

CAL - Direct interface designed to facilitate behavioral change.

CMI - Management and evaluation of a process designed to facilitate behavioral change.

CAL - Supportive or ancillary nonadministrative, instructionally related activities which facilitate the operation of the course/unit learning process.

The author is assistant dean, federal projects, for the Orange Coast Junior College District, Costa Mesa, Calif.

## Letters to the Editor

## Proper Credit

To the Editor:

In your editorial of Dec. 11 you gave me credit for developing the concept of virtual memory. I'm not sure who first started using this idea, but surely the "one-level store" of the Atlas computer preceded me in this. I think those of us who are in the publishing business should be more careful to give credit where it is due. While I have tried to stress this in the past and verbiage of virtual storage, I can hardly take credit for it.

With respect to the very suc-

cessful development of the Michigan Terminal System, a time sharing system which runs on the duplex 360/67, again I must set the record straight, in that the architects of this system are Mike Alexander and Don Boettner of the University of Michigan Computing Center.

Bernard A. Galler  
University of Michigan  
Ann Arbor, Mich.

## Gigo Revisited

To the Editor:

It would appear that the opinions expressed recently relating

to your Gigo editorial ended the point of the issue in order to express some hidden bias. In contrast my bias is obvious - I'm convinced that much can yet be accomplished in the field of automatic programming and that input validation coding automatically generated as a result of the program design is a first step toward total system generation.

All seem to agree that bad input will generate bad results but the program does not operate correctly (i.e., as planned). Programmed validation of input can go only so far in protecting

(Continued on Page 5)



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## Letters to the Editor

(Continued from Page 4)

against incorrect inputs. While cross-totals can be kept for end-of-day balancing in certain application areas, no logical coding can prevent a reservations clerk from misspelling an original input name and some result will suffer accordingly.

What matters is *not* where the line of detectable bad input lies today but rather that the line *exists*! Accepting anyone's definitions of "garbage" it still seems that certain incorrect inputs are detectable and certain are not (by programmed coding) and all efforts to increase the former and decrease the latter are to be commended.

What I believe your editorial instinctively called for was "let's do a better job of detecting the detectable." I think a better job can be done through extending Cobol (and like compilers) to automatically generate the coding required to validate inputs based on the characteristics being presently provided by every programmer who has ever written the words "DATA DIVISION." Once it is not possible (except by intent) to omit validation coding we will have taken a giant step toward ridding ourselves of a sizable chunk of garbage input.

B.W. Boering  
Assistant Treasurer  
Talmán Federal Savings  
Chicago

### Out of Focus

To the Editor:

I read with interest your article on Focus (Forum on Control Data Users) [CW, Dec. 4] and I have written to Mr. Stevenson, its president, about a possible name change for this newly formed group.

On Aug. 23 the ComShare users met in Ann Arbor, Mich. to discuss organizing a users' group for their mutual benefit. The objectives were to reduce redundant effort in programming, share files, discuss common problems, and provide feedback to ComShare, Inc. concerning present and future needs. At this national meeting the bylaws were drawn up and a name for the organization was chosen - Focus (Forum of ComShare Users).

I hope you will bring this to the attention of your readers so that there will be no confusion because of the similarity of names.

Margaret Casey  
President

Focus  
Ann Arbor, Mich.

Computerworld welcomes comments from its readers. Preference will be given to letters of 250 words or less. Computerworld reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 2 Austin St., Newton, Mass. 02160.



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## Programmer Wins \$10,000 Study Grant

PHILADELPHIA — Thomas J. Mortimer, an Insurance Company of North America research programmer, has been awarded the company's annual Electronic Data Processing Time Grant.

Mortimer will receive a six-month leave of absence to study methods of applying teleprocessing at INA. Research expenses up to \$10,000 will be paid by the company.

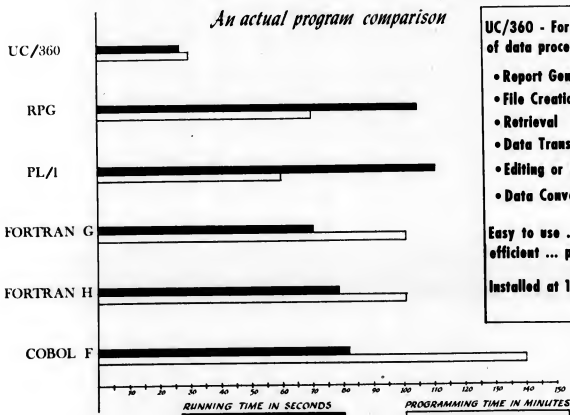
The 27-year-old programmer plans to start his research in March. He will attend a formal computer course for the first month, while the remainder of his time will be used for additional study, planning, and experimentation. INA will provide him with "live" computer time and study facilities.

Mortimer joined INA in August, 1966, without any previous experience in computer work. Since joining the company, he has become a leading exponent in high-level programming languages.

Competition was judged by Ezra Krendel, director of the University of Pennsylvania's Management Science Center; Hugh A. Craigie, vice president, Diebold Corp., and Jerome W. Greckle of Peterson, Howell, and Heather.

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An optional forms design package which includes a light pen and programmable controls provides on-line graphic design capability, character design, and extended image generation capability.

A disk file is available with the unit providing 333,000 words of storage to augment the 4K memory provided as standard equipment.

The unit is capable of producing pictures as well as type fonts,

therefore making it quite suitable for typesetting and composition work. The unit is also capable of producing animated films in either black and white or in color. Typical applications range from training films to kinematic analysis, according to the company. The high resolution makes the unit very suitable for archival storage systems where documents are kept for long periods of time, since it provides extreme uniformity in the images.

The unit, available for delivery starting in early spring, sells for \$225,000.

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H 172 74 263 228 225 142 48 138

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K 200 156 37 102 59 19 27 250

L 186 180 40 232 103 256 75 207



All of this material, including the boxes, was printed by the microfilm recorder.

## Bright Colors Cover Complex PDP-12

[Continued from Page 1]  
ected in this environment is in analog form, therefore this type of computer should provide great convenience for the operator," Kramer said. The use of such systems is expanding at a tremendous rate and a government survey reported that by 1972, educational and medical institutions will be spending in excess of \$1 billion on computers annually, according to the company.

Almost as much human engineering as hardware engineering went into this system. The computer is colored lime-pool green and bright chartreuse to distinguish it from other DEC lines and to enhance the environment where it is used, according to the designer, James Jordan.

Jordan's second theory, more company oriented, is that as prices keep dropping, the company's computers will be appearing in more and more places, with the probability that they will eventually start appearing in the homes of people using them. "When we reach this level, computers must be compatible with modern office and home interior decor," Jordan said.

### System Specifications

The system includes a 4K 12-bit-word memory expandable up to 32K. It has a 1.6 micro-second cycle with a data-bank channel.

The instruction set contains 43 instructions, including half-word instructions, boolean operations, and multiple instructions. There are 15 auto-index registers capable of incrementing when addressed indirectly.

The buffered 7" by 9" CRT can generate up to 400 characters, and includes two buffered analog channels for external access.

The analog-to-digital converter maintains 10-bit accuracy, with a conversion rate of 50 Kiloherztz.

The two buffered tape units require no I/O subroutines. A Linotype controller is available which can control up to eight additional transports at transfer rates of 7500 words per second.

### Prices

Prices run from \$14,900 for the three basic systems. Additional core memory is available from \$3500.

The 66 microsecond disk file start at \$6000 and can be expanded up to four files.

The Linotype is available from \$4950 and regular driver from about \$10,000. The system also will support paper tape, additional displays, plotters, card readers, data communication equipment, and several options for special features with the I/O package. Interfaces are available for the IBM 360 from \$10,000, and others probably will be



Digital's new PDP-12 computer system.

available upon request, the company said. The system will be delivered starting in early spring.

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## A Well-Fed Computer Helps Keep Restaurant Profits Up

ATLANTA, Ga. — Morgan Jul runs a successful restaurant by keeping his computer well fed. Turning on its daily diet of multicolored punched cards, the IBM 1130 enables Atlanta's Midnight Sun Restaurant to maintain tight daily control of 120 categories of food and 200 kinds of beverages.

"We seldom run out of anything, and we can quickly pin-

point waste or loss of food or beverages," Jul said.

To keep the Midnight Sun operating at peak efficiency and profitability, Jul studies a daily computer-generated report which measures the previous day's sales against purchases of food supplies. If the figures vary from an established cost-to-sales ratio, he knows there is a problem.

If, for example, purchase costs are relatively high compared with sales, he knows there probably has been some food wasted or lost.

And Jul also can tell quickly from the beverage report whether customers are getting full servings in their drinks.

"If the report differed from our fixed ratio between servings-per-bottle and price-per-bottle, we would speak to the bartenders," Jul said, "and we would be able to correct the problem when it is just one day old."

"Luckily, this has never happened at the Midnight Sun, but an inexperienced bartender could easily fall into such a habit."

Other routine jobs, such as physical inventory, payroll and accounting records, also are being put on the computer.

Jul, a veteran of 40 years in the hotel and restaurant field, says that keeping financial and operating records current is a chronic problem in his industry. In many restaurants, he notes, accounting runs as much as several weeks behind actual operations.

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Restaurant owner Morgan Jul, using a computer-produced food-control report, confers with chef Jorgan Poulsen.

## Computerized Key Cutter Ordered by Post Office

CAMBRIDGE, Mass. — The Post Office box key is feeling the effects of automation. Starting in 1970, keys for Post Office boxes will be produced by a fully automated system in Washington, D.C. The system, under development by Comstock & Wescott here, requires a single operator to produce a million keys a year in 100,000 different combinations.

Under the present system, local Post Offices send handwritten orders for keys to the mail equipment shop in Washington, D.C. The order includes the serial numbers, box numbers, and quantities desired. A clerk at the shop looks up the serial numbers in a master control book for key cutting information. An order form is then prepared and given to a machine key cutter operator. The keys are number stamped, cut, and deburred, all by hand. They are then placed in an envelope and mailed back to the requesting Post Office.

With the new system, the local postmaster will punch the key number and quantity desired into a punched card and send it to Washington where it will be read and processed by a special-purpose computer which will be an integral part of the key cutting machine. The computer will look up the correct cutting code and convert it into cutting and measurement checking information. Number stamping, cutting, deburring, and measuring will be handled automatically by the computer-controlled key-cutting machine. The machine will be able to resolve depths of cut to plus or minus .001". Finished keys will be automatically blister-packed for return shipment with the original punch card serving as the address. Only one operator will be required per shift.

When in operation, the system will handle all replacement key cutting requirements for the U.S. Post Office.

## Firms Handle Motel Reservations From Special In-House Terminals

Special to Computerworld  
MEMPHIS, Tenn. — Each day 22 U.S. business firms make motel reservations from terminals located in their own travel departments.

During the past two years these firms have joined one of the world's largest commercial computerized communication systems — the Holiday network — which links every Holiday Inn and every H1 Metropolitan Reservation Office.

"Studies have shown us that corporations needing 400 to 500 room nights a month can make good use of a Holiday terminal installed in their travel office," said Roger Rasmussen, vice president of international reser-

vation systems for Holiday Inns of America, Inc. "This terminal gives the corporation access to the more than 1,040 Holiday Inns now open in the United States, Canada, the Caribbean and Europe. Written confirmation of reservations can be obtained within moments because the corporation has the same instantaneous contact with our computerized reservation center that every Holiday Inn has."

"Corporations receiving this service also have access to independent and chain hotels other than the Holiday Inns located outside the United States through our Trav-L-Dex program," Rasmussen said.





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## calendar

Jan. 28-31, Ellenville, N.Y. — 1969 International Symposium on Information Theory. Contact: IEEE, 345 E. 47th St., N.Y. 10017.

Feb. 7-8, Gainesville, Fla. — "Executive Decisions for Effective Computer Utilization." Contact: Heine Dieter, Computer Management Corp., 1105 W. University Ave., Gainesville, Fla. 32601.

Feb. 13-14, Las Vegas, Nev. — Adaspo Management Conference. Contact: J.L. Dreyer, Adaspo, 420 Lexington Ave., New York, N.Y. 10017.

Feb. 24-25, Washington, D.C. — IEEE Conference on "Where Technology is Leading Communications." Contact: Charles A. Meyer, Commercial Engineering Services, RCA, Harrison, N.J. 07029.

Mar. 14, Baltimore, Md. — "Double Your Effectiveness." Contact: DPMA International Headquarters, 505 Busse Hwy., Park Ridge, Ill. 60068.

Mar. 24-26, New York — "Systems Approaches to Educational Administration." Contact: American Management Association, AMA Amodeo Bldg., W. 50th St., New York, N.Y. 10020.

## IEEE Drafts Dual Appeal Conference

WASHINGTON, D.C. — The Institute of Electrical and Electronics Engineers will sponsor a conference here Feb. 24-25 on "Where is Technology Leading Communications?"

The conference sessions have been structured for both design engineers and businessmen. Special emphasis will be placed on the computer and automation techniques in various communications fields.

The conference, conducted by the IEEE's Engineering Writing and Speech Group, will be at the Washington Hilton Hotel.

The first session, Feb. 24, will present an overview of new technologies in the publishing industry, with emphasis on computerized typesetting. Chaired by Dr. N.I. Korman, consultant and former RCA corporate executive, the session will discuss equipment applications and capabilities.

That afternoon the conference will sponsor a tour of the Government Printing Office where automated techniques are in extensive use.

The evening session will consider modern techniques for nonprint media, and will include discussions on the latest methods in videotape, film, and combination slide-audio tape presentations. Charles A. Meyer, manager of commercial engineering technical services at RCA, will be chairman.

The morning session Feb. 25 will cover working applications of new technologies. Some of the areas to be covered include computerized cataloging and preparation of instruction manuals for the defense industry. Dr. Korman will chair this session since it is a continuation of his Feb. 24 program.

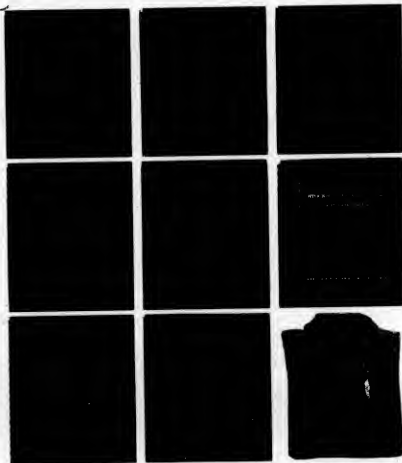
The final session will consider changes which will be necessary in editorial practices during the next five years to accommodate the technological advances. Discussions will cover writing, editing, illustrating and layout, and production control. Paul Doehler, editor of *Book Production Industry*, will be chairman.

Program details and advance registrations may be obtained from Charles A. Meyer, manager, commercial engineering services, RCA, Harrison, N.J., 07029.

### Single-Source EDP Financing Plan Offered

PHILADELPHIA — A new single-source computer marketing-financing plan, called Computer Resources Financing, is now being offered by Scientific Resources Corp. According to Thomas T. Fleming, president, the company will offer hardware, software, systems implementation, installation, and related services in a total systems performance package for a monthly fee. Scientific Resources Corp. is the new name for the operating entity which emerged from the recent acquisition by Sunasco, Inc. of Mauchly Associates, Inc.

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# Price, Maintenance And Issues

(Continued from Page 1)  
 Judge last month said the DPF&G suit lies in the positions of the two companies, according to DPF&G President Harry Goodman. CDC is primarily a hardware manufacturer. DPF&G is an IBM customer and middle-man between IBM and users.  
 Goodman contends that although DPF&G has been very successful under IBM's current practices, it has been prevented from further success because of IBM's activities.

## Software Costs Important

IBM's "free" software also has damaged DPF&G, according to the suit. It prevents DPF&G from selling separate software and forces purchasers to pay for the total cost of the system instead of on just the cost of hardware since no cost breakdown is available.

According to the complaint, many companies have been forced to receive and pay for software for which they had no use in addition, there is no practical way for a customer to be aware of the extent to which he is buying software.

The complaint also alleges that IBM by deliberately and willfully failing and refusing to define the nature and extent of the license to which purchasers and lessees of IBM (computers) are entitled "makes the intimidation and coercion of prospective customers possible."

## Separate Pricing

One outgrowth of the separate pricing dispute is the recent signing of the General Services Administration Procurement Schedule, which provides that all manufacturers participating in the schedule must provide cost breakdowns for hardware, software, and maintenance. These provisions may weaken DPF&G's arguments, according to an industry figure.

Another allegation in the software area is the claim that "Licensees and purchasers (of computers) have been forced to use software of substantially lower quality than is available from sources other than IBM."

## Definition of Software

As part of the complaint, an extensive definition of software

is included. The effect of this definition is to maintain that everything except the actual hardware and maintenance are part of the software costs.

This definition poses some serious problems when considered in the light of current practice, according to industry sources. The incorporation of systems engineering services and educational services under software may provide many opportunities for confusion.

## Taxes Are Involved

DPF&G claims that package pricing by IBM has forced users to pay "state and local excise, use and personal property taxes on the price or value of the entire package..." This would include services as well as products. This allegation may raise problems as to the percentage of the cost which is represented by tangible property, according to a member of the legal profession.

## Maintenance Problems

DPF&G also alleges that IBM has "coerced and compelled" purchasers of IBM equipment to enter into IBM maintenance contracts for their equipment "largely through the use of its [IBM's] absolute control over the price and availability of spare parts."

The complaint further alleges that IBM discriminates against purchasers by giving preference to holders of IBM maintenance contracts, and that users of IBM equipment "have been forced to use maintenance of substantially lower quality than is available from other sources..."

## The Subsequent User Problem

As previously mentioned, the complaint alleges that "IBM supplies its full complement of software without additional charge only with new or used equipment leased from IBM or with purchased equipment which has not become 'subsequent user' equipment."

"Thus, according to the complaint, equipment returned to DPF&G at the expiration of its user equipment, regardless of its age or number of prior users. When equipment becomes subsequent user equipment, a large portion of the initial purchase price [which represents software] is forfeited. In contrast,

## DPF&G Cites 1968 Consent Decree

By Peter L. Briggs

CW Staff Writer

NEW YORK — DPF&G, in part of its antitrust suit, claims that it is a "third party lessee" under the 1968 Consent Decree between the United States and IBM.

The company contends that it is a "member of the class intended to be benefited by the provisions of the Consent Decree." This concept could be interpreted as making the antitrust case, according to one attorney with experience in the antitrust field.

DPF&G claims that IBM has violated various sections of the Consent Decree and damaged DPF&G by such violations. The Consent Decree, originally intended to prevent IBM from engaging in monopolistic practices in the area of punched card data processing, proves to be an unusual document, according to a DPF&G spokesman.

The company alleges that IBM has violated those sections of the consent decrees dealing with: reasonable price ratios between the sale and lease price of all IBM EDP equipment; reasonable credit terms for purchases with suitable credit ratings; and the requirement for sale of equipment no less favorable than those paid for lease, full and fair disclosure of prices and terms for sale and lease, offering without charge the same services to purchasers as to lessees; maintenance and repair of machines for owners at nondiscriminatory prices, and sale to purchasers at nondiscriminatory prices of parts and subassemblies.

CW says that the undefined words machine and dealer in the Consent Decree, raise some question about the coverage of the section dealing with full disclosure of prices. It is possible that (using a normal definition of software) software is included within the meaning of these two words, therefore implying that software prices need not be shown separately.

DPF&G has alleged that the entire area of the Consent Decree was flagrantly violated and that, with the number of violations, there is no way to enforce the requirements without breaking IBM into the four components discussed in the antitrust story.

the complaint continues, lessees of IBM are not subject to restrictions on their use of equipment. An industry source has noted that this claim is built, at least in part, on the concept that IBM has done wrong simply because it wants to make a profit.

DPF&G claims that their equipment is devalued arbitrarily. Our industry source says, however, that arbitrary devaluation is "one of the basic risks of the leasing game."

## Government Marketing

"These practices have foreclosed [DPF&G] from selling or leasing their equipment... to the United States government, which ordinarily refuse[s] to purchase subsequent user equipment solely because of IBM's discriminatory policies with respect thereto."

While this claim is one of the specific areas where the com-

pany claims losses due to IBM's policies, an informed observer questions its significance since U.S. government sales represent only 5% of IBM's market.

IBM has encouraged intimidation and coercion of potential purchasers by penalizing its sales force for selling rather than leasing, claims DPF&G. "In fact, IBM equipment was sold rather than leased, on most IBM equipment, IBM's sales force would receive a net commission of exactly 50.00%."

The suit alleges that "IBM has made exorbitant charges to [plaintiff] lessees for installation [of computers] and the furnishing of improved hardware... while making no similar charge to IBM lessees."

This is an example of the discriminatory pricing tactics in-

volved, according to Goodman. "Similarly, IBM repairs rather than replaces damaged equipment purchased by IBM (computers) whereas [the same things] on leased equipment are replaced with new parts."

Again, an industry source pointed out, in this area DPF&G is spreading its claims a "little thin." The suit alleges that IBM does not pay for down time on purchased systems where they do on leased systems. "This seems reasonable. If you buy the equipment, you don't pay overtime on it either," our source said.

The issue of one company blaming the other's equipment for every malfunction in a mixed system is raised in the suit. There seems little doubt that this practice exists in every industry, is almost impossible to stop, and applies to all companies equally, an informed industry figure stated.

## Tort Action

A separate claim for damages under the tort rules was included by DPF&G. This action claims that the practices mentioned elsewhere in the suit were intended to injure DPF&G. The requested sum of \$1 billion as punitive and exemplary damages. There seems little doubt that the largest suit ever brought to court, as far as CW can determine at press time. The total amount of the damages requested comes to \$2,054,500,000.

## Rumors Checked

Over the weekend NBC and the Washington Post reported that the Department of Justice was about to file another antitrust suit against IBM. The word from the Attorney General's Public Information Office was "No Comment." IBM termed the rumor "Speculative."

A rumor that Univac was about about to start antitrust proceedings against IBM was scotched by Richard Mau, Univac's Director of Communications when he said, "There is absolutely no basis in fact in the rumor that Univac or Sperry Rand is going to sue IBM."

## BU to Add Computer Law

BOSTON — Boston University's Law School is presenting what is believed to be the first course on computers and the law. Fifty second and third year students have enrolled.

Roy Freed, a Yale Law School graduate and senior consultant at Harbridge House, Inc., a management consulting firm in Boston, will teach the course. He pioneered in the investigation of special legal questions raised by the use of computers for record keeping, factory operation, clinical medical procedures, and other applications in business, industry, the professions, and government.

The course will cover such topics as how novel types of computer records will fare in the courts, how reliance upon computers instead of people affects

legal liability, what problems confront banks that turn to computers (and their depositors, as well), how computers fit into the many facets of securities-marketing, how to avoid pitfalls when buying or leasing computers, whether existing criminal laws cover sales involving computers, and how court operations can be streamlined through computerization.

## Temporary Course

Freed doesn't see the course as a permanent fixture in the law school curriculum. "Law school professors become as knowledgeable about computers as their students are," he said, "the subject matter of the course probably will be distributed among traditional courses."

## Leasing Policies Hit

## 'Eliminate or Hinder' Charged by DPF&G

By Peter L. Briggs

CW Staff Writer

NEW YORK — DPF&G deals directly with the problem of the relationship between leasing companies and IBM in several sections of the allegations contained in its suit against IBM.

DPF&G contends that, in addition to the practices specified elsewhere in the suit, IBM's policies against leasing companies have intensified recently, in direct response to the growth of the leasing industry.

The suit alleges, "Upon information and belief, the intensification of IBM's anti-leasing company activities has been coordinated and directed, in part, by a high-level policy-making department, known as the 'Leasing Company Relations Department' which, like various predecessor departments, committees and individuals within IBM, has had as its major function the formulation of policies and

practices calculated to eliminate or hinder competition from leasing companies."

The suit further contends that, "IBM's sweeping policy directive to its branch managers earlier this year, that leasing companies were to be treated as 'competitors in every sense of the word,' was intended to sanction the intensification (of the discriminatory practices)."

Several sources in the leasing industry, while confirming certain parts of the allegation, deny that they have had difficulties dealing with the leasing relations department. They feel that, in general, relations between leasing companies and IBM have been cordial.

During this period, IBM relaxed its restrictions on education and systems engineering support for second party users, although as far as can be determined, the policy still relates to subsequent users.

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## Application of Hal Permits Multiple Help for Teachers

Special to Computerworld  
WELLESLEY HILLS, Mass. — Hal (not the one from 2001), a new computer-assisted instruction system, has been announced by Honeywell's EDP division. The CAI application package uses Honeywell's Author Language, a simplified programming language requiring little or no previous experience by the teacher which can be used for interactive learning with the manufacturer's computers, according to Kenneth Innman, marketing manager for educational systems.

Hal permits the teacher to prepare and display educational material and reading matter on a 12" CRT at each student's station. The student uses a keyboard to respond or to question the system. The computer keeps track of each student's progress and prints out progress reports on request, according to Innman. The system permits the teachers to monitor each student and to provide remedial information as needed.

The language incorporates routines that "liberate" instructional programs written in Coursewriter and Coursewriter II, programming languages used by IBM for CAI. The system requires a minimum of a Honeywell 1200 with 32K, three tapes, one disk, and six VPI terminals for students. Additional student terminals can be added by increasing main memory size, according to Innman. A 1200 with 48K memory can support 32 VPI terminals simultaneously, he said.

## DOS/TOS Program Permits Varied Control by User

McCLEAN, Va. — A proprietary program for DOS/TOS users to intercept operator control or program checks and transfer control to the operator has been made available by Computer Resources Corp.

The program permits the operator to take one of several aspected actions: continue processing, correct the error, or abort the program. The purpose is to stop the aborting of programs because of defective inputs or programming errors, according to the company.

It can be used as a console debugging method for program testing and during production shutdowns runs where the error may be less than perfect. The package also allows the operator to interrupt program processing at will to modify the system environment or instruction set during execution.

According to the manufacturer, the package is available for \$10, and includes a program deck, operating and use instructions, and a load module disk.



## Critical Drawing

An engineer uses a CPM (critical path method) network drawing produced by CalComp's new Autonet program. The system uses the output from CPM programs to generate input commands for a CalComp plotter. The plotting can be done either on-line or off-line.

## Rax Incorporates New File I/O Ability

Special to Computerworld  
WHITE PLAINS, N.Y. — An improved version of Rax, IBM's Remote Access Computing System, has been announced. The improvements allow new file I/O capabilities for remote terminal users connected to a 360/40 or 360/50. The system allows engineers and scientists to use terminals for conventional time-shared problem solving. Version 3 of Rax now permits users to read and write permanent or temporary files directly from their terminals. Multiple users within an organization can all have access to the same permanent files. Version 3 also permits users to store object program modules as well as source programs in the system files.

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Maid Compares Statements  
For Merger Possibilities

PASADENA, Calif. — Companies planning mergers will find a new computer package, called Maid, most useful, according to Economatrix, the developer.

The program compares the latest annual reports and financial statements of the two companies contemplating merger. Reports are printed out from two viewpoints: the financial behavior if the companies merged, and the behavior if the companies remained separate.

The figures project the next

year of operation and can provide a high level of confidence providing the input figures are accurate, according to the developer.

Maid answers specific questions. It examines the relative profits of mergers versus non-mergers. It can project various needs and requirements for a merger showing where personnel can be combined such as engineering, accounting, marketing, and management groups. According to Dr. Philippe

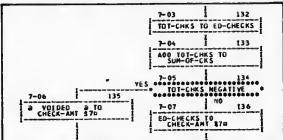
Clavier, company president, the program is concerned entirely with the countless short-term problems of mergers and acquisitions, rather than the long-term effects.

The programs are written in Fortran IV, and can be operated on any second or third generation computer. The programs sell for \$12,600 and include the Fortran source decks, a user's manual, and a demonstration on the customer's computer or at a computing facility.

## Flow-Charting Package Written in Cobol

MOORESTOWN, N.J. — Dynachart is a new automated flow-charting system for computer program documentation created by Applications Programming Co.

A major advantage of the Dynachart is the ability to put as much as 100% more logic per page than conventional flow-charting systems such as Auto-flow. This is made possible by creating parallel logic chart flow in much the same manner as an analyst would define his own logic, using vertical rather than horizontal paths.



The sample above shows the output of the new Dynachart flow-charting package. The package is written in Cobol and runs on RCA Spectra systems or IBM S/360's.

## Simulator Has Memory and Sort Ability

ITHACA, N.Y. — A 1401 simulator which runs as a normal OS/360 job in a 70K partition is available from Computer, Inc.

The simulator may be multi-programmed with any normal job mix and is especially tailored to reduce the run time of I/O bound 1401 programs, according to the company. Another feature of the system permits the spooling of large printed punch outputs.

The package is available for \$4000 or can be leased for \$350 per month. The prices include on-site installation, complete documentation, and one year's maintenance.

## IBM 360 Gets New Ledger System

COLLEGE PARK, Md. — A new general ledger system for the IBM 360 has been announced by Delta Data Systems. The system provides a computer oriented accounting tool, according to the company, and can be adapted for use on other computer systems.

The programs provide for easy maintenance of master files, zero balance reports, journal listings, ledger postings, FLI statements and balance sheets. In addition the system provides such options as year-end closings and selective pricing.

The price of the system is \$1000, which includes installation, manuals, and a warranty.

Newer Systems for  
360 and 1130 Ready

WHITE PLAINS, N.Y. — New linear programming systems have been announced for users of the IBM 360-DOS and 1130 systems.

LPS/360 and LPS/1130 are based on the existing Linear Programming-Mathematical Optimization Subroutine System (LP-MOS) originally developed for the 1130, according to IBM. The new packages will have data compatibility with LP-MOS and each other. LPS/360, which will be available the first quarter of this year, requires 32K under DOS. LPS/1130 is scheduled to be available the second quarter of this year, IBM said.

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## Services Gain Top Favor For Greyhound Computer

PHILADELPHIA — A switch in emphasis from computer leasing to peripheral services was recently indicated by Gerald H. Trautman, president and chief executive officer of the Greyhound Corp.

Trautman predicted that "the next few years will see Greyhound's greatest expansion in the field of computer services." "All studies show," he told members of the Financial Analysis of Philadelphia, "that the computer services field will grow tremendously in the next few years, and we are equipping ourselves to take advantage of this trend."

Trautman said Greyhound Computer Corp., a Greyhound subsidiary, "will, of course, continue to lease computers." The subsidiary's data services staff, Trautman said, has been enlarged from one employee in 1967 "to a professional organization of more than 125 employees."

Greyhound Computer today "actively operates" three large data-service centers, its project management software group is involved in real-time and optical-scanning projects, it recently acquired a data-processing personnel-placement organization, and "we are embarking on

a time-sharing operation," Trautman declared.

Many of these computer services will be made available in Canada through Greyhound Computer of Canada, Ltd., he added.

Trautman said his company has "not ruled out" the possibility of acquiring an interest in a manufacturer of "peripheral input/output devices that surround the central computer," — such items as magnetic tape drives, disk drives, printers, and remote terminals.

## RCA Expects to Set Records Again

NEW YORK — RCA's sales and earnings in 1968 are expected to set new all-time records for the seventh consecutive year, Robert W. Sarnoff, president and chief executive officer, reported in a year-end statement.

He told the company's 330,000 shareholders that preliminary figures indicate sales in 1968 will surpass \$3.1 billion and profits after taxes will exceed \$150 million for the first time. Per share earnings will approximate \$2.35, compared with \$2.27 in 1967.

Sarnoff said that during these seven years of continuing progress RCA sales have increased

NEW YORK — Banks could prove to be a dominant factor in the rapidly growing computer leasing industry during this year, according to W.I. Newstetter Jr., a vice president of Hanoverfield Corp., a firm specializing in corporate financial management.

A 25% growth in leased equipment, says Newstetter, an expert on leasing, is underscored by the leasing potential of computers. To date, an estimated 30% of all computers outstanding are leased, but less than 5% of this market has been captured by third-party lessors. Moreover, he says, the projected growth is exceptional.

During the next decade, Newstetter predicts that banks could become the dominant factor in the leasing industry. He also believes the banks will be joined

80% and after-tax profits have more than tripled.

"The substantial impact of the federal surtax slowed the profit growth rate in 1968, but it did not diminish the vigor of our marketing thrust," he stated.

Included among the principal developments which Sarnoff said contributed to RCA's progress in 1968 was that RCA Information Systems increased its domestic lease revenues from computers by more than 45% over 1967 and maintained a leading position as a supplier of large-scale communication-oriented systems among state and local governments.

## Banks to Evaluate Leasing As Means to Higher Profit

by insurance companies who will utilize the banks for short-term participations and handle the longer-term leases themselves.

"It is expected that total computer leases written by non-manufacturers should exceed one billion dollars in 1969, more than a 25% increase over 1968."

Banks, which, according to Newstetter, "have been reluctant to enter the high profit potential of leasing," will begin to play a more commanding and volun-

tary role in the leasing of computers.

"In banking, as in all businesses," he says, "there is a growing emphasis on earnings per share. Many banks are turning to new and different services as a means of earning additional income. Because the business executive is increasingly coming to look upon leasing as another way to borrow funds, it appears that leasing and the banks are a natural team."

## Acquisitions

### Rixon and United Utilities to Combine

KANSAS CITY, Mo. — Officers of United Utilities, Inc., and Rixon Electronics, Inc., Silver Spring, Md. have executed an agreement and plan of reorganization through which Rixon will be combined with United. Rixon will submit the agreement to its stockholders for approval in late March or early April. The agreement is subject to receipt of a favorable Internal Revenue Service ruling and other government approvals, but does not require the approval of United's stockholders. Terms call for the issuance of 0.8 share of United common stock for each of the 723,881 common shares of Rixon outstanding or committed. Rixon designs and manufactures a line of data terminal equipment used in computer communications.

### Automation Industries, Inc. And Vitro Corp. to Merge

LOS ANGELES — Shareholders of both Automation Industries and Vitro Corp. of America, New York, have approved a merger agreement in which Vitro will become a wholly owned subsidiary of Automation Industries, according to an announcement by Corwin D. Denney, president, Automation Industries. The agreement provides for a tax free exchange of 0.725 shares of Automation common stock for each share of Vitro common stock. Vitro is a supplier of systems management engineering of complex programs to government agencies.

### Electronic Memories to Acquire Dickson Electronics

HAWTHORNE, Calif. — An agreement in principle has been reached for the acquisition of Dickson by Electronic Memories, according to an announcement by Trade C. Taylor, president of Electronic Memories. Terms of the agreement provide for the issuance of 0.5 to 0.55 shares of Electronic Memories common stock for each share of Dickson common stock. The transaction is subject to the approval of the Boards of Director of both companies, approval by the Dickson shareholders, and certain other conditions.

### Cubic Corp. to Acquire Process Consulting

SAN DIEGO, Calif. — Cubic Corporation announced it has entered into an agreement to acquire 100% of Process Consulting, Inc., for an undisclosed amount of Cubic stock. In the same announcement, the company stated it had purchased the remaining 42% of San Diego Computing Company stock for cash. Cubic's president, Walter J. Zable, said future plans call for merging the two concerns into one subsidiary.

### C.A.C.I. Acquires ACS

LOS ANGELES — Consolidated Analysis Centers Inc., a computer software firm, has entered into a preliminary agreement with Associated Computing Service, Inc., Canoga Park, to purchase all outstanding ACS stock for an undisclosed amount of C.A.C.I. stock. ACS, a software services company, will continue to operate independently under its present management.

This advertisement appears only as a matter of record.

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has acquired

## Gulf Insurance Company

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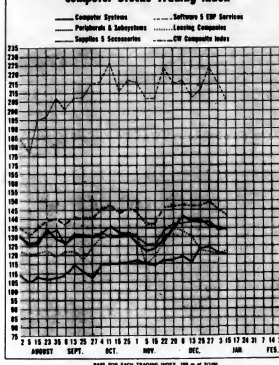
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January 7, 1969

## Computer Stocks Trading Index



# CW Index Off; No Dow Rally

The expected year-end rally failed to materialize during the week ended Jan. 3. It was only the sixth time in 41 years that prices didn't move higher by New Year's Day than they were on Christmas Eve.

The Dow Jones industrial average closed at 944 on Dec. 31, its lowest level of the month which saw it set a year's high of 985.21 (Dec. 3). The Dow gained ground the first few days of 1969, and closed at 952, still down 15 points (1.56%) in the two weeks covered in the Computer Stocks Trading Summary.

Other market indexes were also down generally from 1% to 2%. Computer stocks fared worse during the period. The CW composite stock index fell 6 points (4.03%), to close at 143.

Losses outnumbered gains among Computerworld listed stocks, 70 to 30, with 5 remaining unchanged. Fifteen of the losers and 6 of the gainers changed 10% or more during the two weeks ended Jan. 3.

## Software &amp; Services

The Software & EDP Services sector continued to be the most volatile. The sector index fell 19 points (8.46%) to 205 while eight sector stocks suffered large losses.

Datatab led the way, falling 3-1/2 (18.95%). National Computer Analysts, up 15% previously, fell 4 points (17.39%) during the two-week period.

Strategic Systems was off 7 (15.91%); Computer Network, off 8 (13.79%); Computer Usage, off 6 (13.64%); Aris-

Automation Sciences, and Brandt Applied Systems each lost 10%.

TBS Computing Center rose 2 (17.39%) to 13-1/2 while Advanced Computer Techniques added 1-1/2 (11.54%). Informatics split two-for-one.

## Lectro Up 32%

Two low-priced Lessing sector stocks made very substantial gains as their sector index remained at 122. Lectro Computer Leasing rose 2 (22.09%) to 8-1/4 and NCC Leasing gained 2-1/8 (22.08%) to 11-3/4.

Cyber-Tronics added 1-3/8 (15.98%) gain was the only substantial one in the sector.

Peripherals & Subsystems

The Peripherals & Subsystems sector fell 6 points (4.29%) to 135. Milgo Electronics' 4-3/8 (15.98%) gain was the only substantial one in the sector.

Information Displays fell 3-1/4 (13.69%) and Optical Scanning dropped 15 (11.28%). Data Products set a new 1968-high of 25-1/2.

The Supplies & Accessories sector was off 4 points (3.23%) to 120 and featured three large losers and no large gainers: Nashua Corp. fell 6-3/4 (13.64%), Baltimore Business Forms, off 3 (10.39%); and Memorex, down 9 (9.32%).

Sperry Rand's 1-1/8 (2.34%) gain was the largest in the Computer Systems sector, which was off 2 (4.66%) to 135. Collins Radio, down 5-3/8 (7.26%), suffered the largest loss of sector stocks.

## COMPUTER STOCKS: TRADING SUMMARY

Two Weeks Ended January 8

|          |            |         |         |          | Two Weeks Ended January 9    |          | %       |           |
|----------|------------|---------|---------|----------|------------------------------|----------|---------|-----------|
| EXCHANGE | BASE PRICE | 1964-89 | CLOSING |          | COMPUTER SYSTEMS             | WEEK NET | WEEK %  | % CHANGE  |
|          | 3-1/8      | RANGE   | PRICE   |          |                              | CHANGE   | CHANGE  | FROM BASE |
| NYSE     | 194 5/8    | 253-287 | 286 1/2 | + 3 1/8  | Burroughs                    | - 2 1/4  | - 0.95  | - 44.73   |
| NYSE     | 67 1/2     | 84-88   | 86 5/8  | + 1 3/8  | Control Radio                | - 5 3/4  | - 7.06  | - 1.99    |
| NYSE     | 101 1/2    | 134-140 | 137 1/2 | + 3 3/8  | Control Systems              | - 1 1/2  | - 1.58  | - 2.74    |
| AMEX     | 102        | 177-193 | 177 1/2 | - 5 1/2  | Digital Equipment            | - 1 1/4  | - 0.72  | - 6.81    |
| NYSE     | 19 1/8     | 27-28   | 28 7/8  | + 1 7/8  | Electronic Assoc.            | - 1 1/4  | - 1.08  | - 19.61   |
| NYSE     | 87 1/4     | 100-101 | 99 1/2  | - 1 1/2  | General Electric             | - 1 1/2  | - 1.13  | - 7.74    |
| NYSE     | 60         | 91-93   | 93      | + 3      | Hewlett-Packard              | - 4 5/8  | - 5.26  | - 31.33   |
| NYSE     | 93 1/2     | 144-149 | 144 1/2 | - 4 1/2  | Honeywell                    | - 4 1/2  | - 4.14  | - 21.34   |
| NYSE     | 264 1/2    | 375-390 | 382     | + 16 1/2 | IBM                          | - 1 1/2  | - 1.11  | - 3.14    |
| NYSE     | 103 7/8    | 153-160 | 157 1/2 | + 3 3/4  | NCR                          | - 2 7/8  | - 3.21  | - 12.63   |
| NYSE     | 46 7/8     | 53-56   | 54 1/2  | + 7 1/2  | Raytheon                     | - 1 1/2  | - 1.02  | - 2.32    |
| NYSE     | 39 1/8     | 53-54   | 54 1/4  | + 1 1/4  | Raytheon Corp.               | - 1 1/2  | - 1.02  | - 3.33    |
| NYSE     | 42 1/8     | 55-56   | 55 1/2  | + 3 1/2  | Scientific Data              | - 2 1/8  | - 2.01  | - 16.79   |
| NYSE     | 78 1/4     | 134-142 | 137 1/2 | + 9 1/4  | Scientific Data              | - 2 1/8  | - 2.01  | - 16.79   |
| NYSE     | 46         | 53-55   | 54 1/4  | + 1 1/4  | Sperry Rand                  | - 1 1/2  | - 1.02  | - 3.33    |
| AMEX     | 22 1/2     | 29-30   | 29 1/2  | - 1 1/2  | Systems Eng. Labs            | - 1 1/4  | - 1.13  | - 28.60   |
| EXCHANGE | BASE PRICE | 1964-89 | CLOSING |          | PERIPHERALS & SUBSYSTEMS     | WEEK NET | WEEK %  | % CHANGE  |
|          | 3-1/8      | RANGE   | PRICE   |          |                              | CHANGE   | CHANGE  | FROM BASE |
| NYSE     | 14 3/8     | 22-23   | 22 1/2  | + 1 1/2  | Adamsograph-Multigraph       | - 1 1/2  | - 1.02  | - 28.71   |
| OTC      | 21         | 25-26   | 25 1/2  | + 1 1/2  | Alphamatic                   | - 4 1/2  | - 4.00  | - 28.71   |
| NYSE     | 29         | 41-42   | 41 1/2  | + 1 1/2  | Amper                        | - 1 1/2  | - 1.02  | - 34.49   |
| OTC      | 17 1/4     | 21-22   | 21 1/2  | + 1 1/2  | Billy Edwards & Newman       | - 1 1/2  | - 1.00  | - 37.99   |
| NYSE     | 18 1/2     | 27-28   | 27 1/2  | + 1 1/2  | Bunker-Ramo                  | - 1 1/2  | - 2.88  | - 35.90   |
| AMEX     | 24 1/2     | 30-31   | 30 1/2  | + 1 1/2  | CalComp                      | - 1 1/2  | - 1.02  | - 34.49   |
| OTC      | 12         | 14-15   | 14 1/2  | + 1 1/2  | Centronics                   | - 1 1/2  | - 0.87  | - 11.02   |
| NYSE     | 13 1/4     | 18-19   | 18 1/2  | + 1 1/2  | Computer Equipment           | - 1 1/2  | - 3.74  | - 87.21   |
| AMEX     | 15 1/4     | 25-26   | 25 1/2  | + 1 1/2  | Data Products                | + 2      | + 7.37  | - 16.88   |
| OTC      | 19 1/4     | 24-25   | 24 1/2  | + 1 1/2  | Digital                      | - 1 1/2  | - 0.08  | - 0.33    |
| OTC      | 30         | 35-36   | 35 1/2  | + 1 1/2  | Electronic Memories          | - 1 1/2  | - 0.88  | - 26.25   |
| NYSE     | 18 1/2     | 24-25   | 24 1/2  | + 1 1/2  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 2.59    |
| OTC      | 12 1/2     | 16-17   | 16 1/2  | + 1 1/2  | Farrell-Tek                  | - 1 1/2  | - 1.39  | - 44.00   |
| AMEX     | 14 3/8     | 22-23   | 22 1/2  | + 1 1/2  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 26.25   |
| NYSE     | 17 1/2     | 24-25   | 24 1/2  | + 1 1/2  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 26.25   |
| OTC      | 74         | 145-151 | 147 1/2 | + 3 1/2  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 26.25   |
| OTC      | 18         | 42-43   | 42 1/2  | + 1 1/2  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 26.25   |
| AMEX     | 25 1/8     | 38-39   | 38 1/2  | + 3 1/4  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 26.25   |
| OTC      | 40 1/4     | 99-100  | 99 1/2  | - 1 1/2  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 26.25   |
| NYSE     | 42 1/8     | 55-56   | 55 1/2  | + 3 1/2  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 26.25   |
| OTC      | 47         | 150-151 | 150 1/2 | + 1 1/2  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 26.25   |
| NYSE     | 38 1/2     | 51-52   | 51 1/2  | + 1 1/2  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 26.25   |
| OTC      | 40 1/4     | 99-100  | 99 1/2  | - 1 1/2  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 26.25   |
| NYSE     | 242 1/4    | 321-329 | 324 1/2 | + 2 1/2  | Farrell-Tek                  | - 1 1/2  | - 0.58  | - 26.25   |
| EXCHANGE | BASE PRICE | 1964-89 | CLOSING |          | SUPPLIES & ACCESSORIES       | WEEK NET | WEEK %  | % CHANGE  |
|          | 3-1/8      | RANGE   | PRICE   |          |                              | CHANGE   | CHANGE  | FROM BASE |
| OTC      | 48 1/2     | 64-67   | 64 1/2  | + 1 1/2  | Aztec Video                  | - 1 1/2  | - 0.43  | - 7.32    |
| NYSE     | 20 1/2     | 28-29   | 28 1/2  | + 1 1/2  | Balmain Business Forms       | - 1 1/2  | - 0.70  | - 3.40    |
| NYSE     | 19 1/8     | 25-26   | 25 1/2  | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 0.90  | - 39.82   |
| AMEX     | 27         | 44-45   | 44 1/2  | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 2.41  | - 7.41    |
| OTC      | 41 1/4     | 46-47   | 46 1/2  | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 0.60  | - 1.40    |
| OTC      | 27 1/4     | 44-45   | 44 1/2  | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 0.76  | - 46.79   |
| NYSE     | 64 1/4     | 119-121 | 120 1/2 | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 5.07  | - 7.87    |
| OTC      | 18 1/2     | 24-25   | 24 1/2  | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 0.34  | - 34.91   |
| NYSE     | 27 1/4     | 32-33   | 32 1/2  | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 4.28  | - 22.93   |
| NYSE     | 47 1/4     | 106-107 | 106 1/2 | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 13.64 | - 28.93   |
| OTC      | 61 1/4     | 96-98   | 96 1/2  | - 1 1/2  | Berry-Wright                 | - 1 1/2  | - 1.04  | - 53.99   |
| OTC      | 31 1/4     | 36-37   | 36 1/2  | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 0.69  | - 2.19    |
| NYSE     | 24 1/2     | 32-33   | 32 1/2  | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 1.19  | - 19.99   |
| AMEX     | 14 3/8     | 22-23   | 22 1/2  | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 3.09  | - 47.72   |
| NYSE     | 28 1/2     | 37-38   | 37 1/2  | + 1 1/2  | Berry-Wright                 | - 1 1/2  | - 0.26  | - 0.76    |
| EXCHANGE | BASE PRICE | 1964-89 | CLOSING |          | SOFTWARE & EDP SERVICES      | WEEK NET | WEEK %  | % CHANGE  |
|          | 3-1/8      | RANGE   | PRICE   |          |                              | CHANGE   | CHANGE  | FROM BASE |
| OTC      | 7 1/8      | 10-11   | 10 1/2  | + 1 1/2  | Advanced Computer Techniques | - 1 1/2  | - 11.94 | - 166.67  |
| NYSE     | 22 1/8     | 34-35   | 34 1/2  | + 1 1/2  | Applied Data Research        | - 1 1/2  | - 0.47  | - 100.84  |
| OTC      | 19 1/8     | 25-26   | 25 1/2  | + 1 1/2  | Artes                        | - 1 1/2  | - 16.26 | - 1.90    |
| NYSE     | 19 1/8     | 25-26   | 25 1/2  | + 1 1/2  | Artes                        | - 1 1/2  | - 16.26 | - 1.90    |
| AMEX     | 47         | 79-82   | 80 1/2  | + 3 1/2  | Automatic Data Processing    | - 2 1/8  | - 1.01  | - 48.29   |
| OTC      | 4 1/4      | 10-11   | 10 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 1.07  | - 921.89  |
| NYSE     | 4 1/4      | 10-11   | 10 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 1.01  | - 266.67  |
| OTC      | 5          | 15-16   | 15 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 6.91  | - 107.00  |
| NYSE     | 40         | 54-55   | 54 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 13.79 | - 31.79   |
| OTC      | 39         | 60-61   | 60 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 3.72  | - 37.50   |
| AMEX     | 36 1/2     | 60-61   | 60 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 4.82  | - 133.64  |
| OTC      | 12 1/2     | 16-17   | 16 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 7.99  | - 80.00   |
| NYSE     | 12 1/2     | 16-17   | 16 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 18.19 | - 1.19    |
| OTC      | 12 1/2     | 16-17   | 16 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 1.79  | - 14.00   |
| NYSE     | 34 1/2     | 52-53   | 52 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 3.0   | - 17.59   |
| OTC      | 36 1/2     | 52-53   | 52 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 7.24  | - 22.49   |
| AMEX     | 31         | 48-49   | 48 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 8.33  | - 7.15    |
| NYSE     | 31         | 48-49   | 48 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 1.39  | - 29.39   |
| OTC      | 31         | 48-49   | 48 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 1.0   | - 9.24    |
| AMEX     | 31         | 48-49   | 48 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 2.0   | - 18.87   |
| NYSE     | 31         | 48-49   | 48 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 31         | 48-49   | 48 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 1.89  | - 16.43   |
| AMEX     | 31         | 48-49   | 48 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 31         | 48-49   | 48 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 0.44  | - 20.99   |
| OTC      | 31         | 48-49   | 48 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 8.2   | - 146.03  |
| AMEX     | 31         | 48-49   | 48 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 0.72  | - 67.50   |
| NYSE     | 31         | 48-49   | 48 1/2  | + 1 1/2  | Automation Systems           | - 1 1/2  | - 7.89  | - 30.00   |
| EXCHANGE | BASE PRICE | 1964-89 | CLOSING |          | LEASING COMPANIES            | WEEK NET | WEEK %  | % CHANGE  |
|          | 3-1/8      | RANGE   | PRICE   |          |                              | CHANGE   | CHANGE  | FROM BASE |
| OTC      | 19 1/8     | 25-26   | 25 1/2  | + 1 1/2  | Bull-C                       | - 1 1/2  | - 0.58  | - 141.87  |
| OTC      | 4 3/8      | 5-6     | 5 1/2   | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 3.97  | - 921.69  |
| NYSE     | 10 5/8     | 14-15   | 14 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 14 3/8     | 22-23   | 22 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 12 1/2     | 17-18   | 17 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| AMEX     | 10 5/8     | 14-15   | 14 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 28 3/4     | 43-45   | 43 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 14 3/8     | 22-23   | 22 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| AMEX     | 49         | 109-111 | 109 1/2 | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 20 1/4     | 28-29   | 28 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 10 5/8     | 14-15   | 14 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| AMEX     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| AMEX     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| AMEX     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| AMEX     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| AMEX     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| AMEX     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| AMEX     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| NYSE     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13 1/4     | 19-20   | 19 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| AMEX     | 41 1/8     | 53-55   | 53 1/2  | + 1 1/2  | Compu-Serv                   | - 1 1/2  | - 0.33  | - 3.33    |
| OTC      | 13         |         |         |          |                              |          |         |           |



## orders and installations

Control Data Corp. has released details on three orders for its 6000 series computers for scientific and business applications.

The French Atomic Energy Commission has installed a 6500 computer system at its Soddy Nuclear Research Center for use in conjunction with fundamental research in nuclear physics, isotope biology, and radiation control.

Fides, a Swiss Credit Bank subsidiary, has purchased a 6500 system to be used as a service center connected to ETH, the Swiss Federal Institute of Technology.

The Association of Universities for Research in Astronomy has purchased a 6400 system for use at Kitt Peak National Observatory, Tucson, Ariz.



San Jose City College has installed an NCR Century 100 computer to be used for instructional purposes, including business department courses in computer operation and programming and a mathematics course in computer theory.

The Herald Publishing Co., Rock Hill, S.C., has installed a Digital PDP-8 computer to operate its Photon 713-10 and 650

photo composition systems. The computer also handles wire stripping and classified ad storage.

The University of Miami, Coral Gables, Fla., has ordered an IBM 360/65 to provide expanded capability for student and faculty use in course work and research at both graduate and undergraduate levels, and for analysis of research projects conducted by other scientific users in the community. The system will also be used for administrative accounting.

Newbury Industries, Newbury, Ohio, a manufacturer of plastic injection molding machines, has installed a Univac 9200 computer for inventory and production control, cost accounting, and payroll. A card punch and 250 lpm printer will be used in the system.

## New Registrations

**INFORMATION MACHINES CORP.**, 8024 John Towers Ave., San Jose, Calif., a computer services company, filed to register 111,000 common shares and 111,000 common purchase warrants. Proceeds, consisting of one share and one warrant, and at \$8 per unit, intended for payment of debt. The underwriter is Smith, Jackson & Co., Inc., 17 Battery Pl., New York.

**COMPUTER DIMENSIONS, Inc.**, 311 N. Grand St., Dallas, a computer services company, filed to register 150,000 common shares. Proceeds, at a maximum of \$8 per share, intended for payment of debt. The underwriter is Eppler, Gwin & Turner, Inc., 3900 First National Bank Bldg., Dallas.

**PROGRAMMING PRODUCTS, Inc.**, 360 Pine St., San Francisco, Calif., a computer software company, filed to register 300,000 common shares. Proceeds, at \$1.00 per share, intended for working capital. No underwriter.

**PROGRAMMING AND SYSTEMS, Inc.**, 151 W. 51st St., New York, a computer services company, filed to register 200,000 common shares and 200,000 common purchase warrants. Proceeds, consisting of one share and one warrant, intended for working capital. The underwriter is The Jerome & Co., Inc., 15 William St., New York.

**INFORMATION INTERNATIONAL, Inc.**, 545 Technology Sq., Cambridge, Mass., filed to register 250,000 common shares with warrants to purchase 125,000 common shares, to be offered in units, each consisting of two common shares with a warrant to purchase one additional share. Proceeds, at a maximum of \$61 per unit, intended for equipment and working capital. The underwriter is Putnam, Coffin & Burr, -Oodette Inc., a Central Row, Hartford, Conn.

**COMPUTER REPORTING SYSTEMS, Inc.**, 800 Winthrop Blvd., Los Angeles, a computer credit service company, filed to register 200,000 common shares and 81 million convertible subordinated debentures, due 1977. Proceeds, at a maximum of \$2500 per unit, intended for equipment and repayment of debt. The underwriter is Shustan & Co., Inc., 67 Broad St., New York.

**ASTRON CORP.**, 1701 S. State College Blvd., Anaheim, Calif., a magnetic tape manufacturer, filed to register 378,866 common shares. Proceeds, at a maximum of \$15 per share, intended for payment of debt and working capital. The underwriter is Paine, Webber, Jackson & Curtis, 25 Broad St., New York.

**COMPREHENSIVE COMPUTER SYSTEMS, Inc.**, 1 E. 57th St., New York, a computer services company, filed to register 120,000 common shares and warrants to purchase an additional 120,000 shares. Proceeds, at a maximum of \$15 per unit, intended for equipment and working capital. The underwriter is Braun, Yarnoff, & Hess, 29 Broad St., New York.

**ACADEMY COMPUTING CORP.**, 4400 N. Lincoln Blvd., Oklahoma City, Okla., a computer services company, filed to register 300,000 common shares. Proceeds, at \$5 per share, intended for equipment and working capital. The underwriter is Thompson & Co., Inc., 110 Park Ave., Oklahoma City, Okla.

**COMPUTER CONTROLS CORP.**, 2138 Biscayne Blvd., Miami, a computer services company, filed to register 170,000 common shares. Proceeds, at a maximum of \$12.50 per share, intended for expansion, working capital, and other corporate purposes. The underwriter is Voth, Voth, Cannon, Inc., 111 Broadway, New York.

**INTEGRATED DATA SYSTEMS, Inc.**, 8811 Colonnade Rd., Silver Spring, Md., a computer software company, filed to register 250,000 common shares. Proceeds, at \$8 per share, intended for expansion and working capital. The underwriter is Charles Rohn & Co., 200 Park Ave., New York.

**ASTROSYSTEMS, Inc.**, a Nevada Co., Hyde Park, N.Y., filed to register data converter manufacturer, filed to register 100,000 outstanding common shares. Proceeds, at a maximum of \$25 per share, intended for repayment of debt. The underwriter is Arnold Wilensky & Co., Inc., 50 Broadway, New York.

**MASTEC COMPUTER SYSTEMS, Inc.**, 7028 W. North Ave., Chicago, a computer services company, filed to register 110,000 shares of common stock. Proceeds, at \$5 per share, intended for repayment of debt and working capital. The underwriter is Olivé Brothers & Co., 30 Broad St., New York.

**WORLDWIDE COMPUTER SERVICES, Inc.**, 225 West 42nd St., New York, N.Y., a computer software company, filed to register 100,000 common shares. Proceeds, prior to be sold, intended for expansion and working capital. The underwriter is Kern Securities Corp., 111 Broadway, New York.

**DIVERSIFIED COMPUTER SERVICES, Inc.**, 809 Channing St., N.E., Atlanta, O.C., a computer services company, filed to register 250,000 common shares. Proceeds, prior to be sold, intended for expansion and working capital. The underwriter is Adams & Price, 120 Broadway, New York.

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## Computers Become TV Stars

Television, which has been helped by computers, is now helping computers. Stephen Chodes of Honeywell's education research department uses an Ampex videotape system to show computers in action. The company uses the videotapes for marketing, instruction, and training purposes.

## Transamerica to Buy Up to \$5 Million in Disk Drives

LOS ANGELES — Transamerica Computer Co., Inc., a subsidiary of Transamerica Corp., has entered a two year agreement with Marshall Laboratories for the purchase by Transamerica Computer of up to \$5 million of Marshall Labs M2500 equipment as it is leased to end users.

The M2500 is a disk storage drive that is mid to be plug for plug compatible with the corresponding IBM unit.

Marshall Labs, a subsidiary of Marshall Industries, is a computer peripheral equipment manufacturer.

### Army Buys GE Network

BETHESDA, Md. — The Army Corps of Engineers has purchased, from General Electric Co., a network of previously installed GE 200 computer systems and leased a GE 420 time sharing system. The 420

## CONTRACTS

will be used in developing special computer programs and will operate as a direct access programming system when not in the time sharing mode.

### Nasa Extends CSC Contract

MOUNTAIN VIEW, Calif. — The Nasa Ames Research Center has awarded an additional \$338,000 to Computer Sciences Corp., Los Angeles, to continue to operate and expand the telemetry processing system used in the Pioneer space program. The new award covers a one year period.

Under the contract, CSC coordinates the acquisition of data from Pioneer spacecraft missions and monitors data transmitted from the Ames Center to the

Space Flight Operations Facility of the Jet Propulsion Laboratory in Pasadena.

### PRC To Do DIA Work

LOS ANGELES — The Defense Intelligence Agency has selected Planning Research Corp. for a concept and system design of data files required for automatic data processing support of the DIA Cartographic Mapping, Charting, and Geodesy Management System. Currently, Planning Research is developing part of the data base to support these management requirements.

### Honeywell to Buy B-R Units

STAMFORD, Conn. — The Bunker-Ramo Corp. has announced that it will supply Honeywell EDP over the next two and a half years with desk top visual display equipment for use in computer systems. The electronic units, utilizing cathode ray tube display and high speed data communications techniques, provide direct on-demand communication with computers from local and remote locations.

### TWA Selects Milgo Unit

MIAMI — Trans World Airlines has selected International Communications Corp., a subsidiary of Milgo Electronic Corp., to begin delivery this month of data sets to be used in connecting TWA's computerized passenger reservation center in Zurich with the U.S. and cities in seven European countries.

### Greyhound, GE Sign Contract

CHICAGO — Greyhound Computer Corp. has signed a contract with General Electric Co. for a disk drive to be designed for use on third generation computers to provide users with high speed access to data in random or sequential mode. The unit is to be compatible with IBM 360s.

### EAI Gets Federal Contract

SAN DIEGO, Calif. — The Department of the Interior, Office of Saline Water, has awarded a \$64,000 contract to Electronic Associates, Inc., Princeton, N.J., for computer simulation of the desalination plant. The 10

## Firm Is Formed to Design Signal Analysis Systems

WALTHAM, Mass. — Computer technology is being applied to signal processing by a new company formed to design and manufacture computer signal processing systems.

The new company, CSPI (Computer Signal Processors, Inc.) is dedicated to the design of high speed audio signal decoders for wide bandwidth real-time applications. The basis of the new designs are the Fast Fourier Transforms, and the low cost fully integrated circuits now available.

Digital signal analysis has many industrial applications including petroleum prospecting, biomedical research, processing the human voice into computer sig-

nals, military intelligence, and locating schools of fish.

The company intends to manufacture both the hardware for signal analysis, and analytical software to facilitate its use in industry.

### Ferroxcube Appoints Sales Representative

SAUGERTIES, N.Y. — Ferroxcube Corp. has appointed W.A. Brown & Associates as sales representative for its Computer Components Division, Systems Division, and Magnetic Recording Division in the Southeast. Brown has offices in Orlando, Ft. Lauderdale, and Ft. Walton Beach, Fla., and Tucker, Ga., and Huntsville, Ala.

### DPC Renames Sales Subsidiary

CULVER CITY, Calif. — Data Products Corp. has renamed its Data Products Sales Corp. subsidiary as the Data Products Systems Division. John D. Hazard, executive vice president of DPC since early last year, has been appointed president of the renamed division.

### G.K. Hubbard, Others Join Information Network Corp.

PHOENIX — Gary K. Hubbard, formerly with Embassy Management, Inc., has been appointed general manager of Information Network Corp., the recently formed computer time sharing subsidiary of Washburn Magnetics, Inc.

Others joining the firm are Robert F. Haley, applications manager; John C. Dahl, systems manager; Norman H. Liebling; and John R. Lang, sales manager.

### Aries Finishes Univac Job

McLEAN, Va. — The Aries Corp. has completed a contract for Univac, Blue Bell, Pa., for the design, implementation, and maintenance of a disk data management system and a disk sort generator. The project was for the Univac 9300. Scheduled for an 11 month duration, the company reported a nine month completion.

### ACS Gets Stock Work Nod

DALLAS — Broker Data, Inc., an investment securities firm, has selected Affiliated Computer Systems, Inc., a software and computing service company, to develop a computer processing system oriented to investment securities firms, for the purpose of solving the paperwork problem now confronting the securities industry.

### LTV Unit Installs Sigma 7

DALLAS — LTV's Aerospace Corp. has installed an SDS Sigma 7 computer system, valued at \$1.5 million, for use in testing the A-7 Corsair II light attack aircraft. The system is equipped to decipher and process FAM, PCM, PDM, and SCO signals in real time.

### PRC To Do Pollution Study

LOS ANGELES — The Minnesota Pollution Control Agency has awarded a study contract to PLANNING Research Corp. to review the effect of land uses on air and water pollution. Recommendations are to be for presentation no later than February.

### SAS Buys Lit Simulator

BINGHAMTON, N.Y. — Scandinavian Airlines has purchased a Lit DC-9 flight simulator from General Precision Systems, Inc. to enable SAS pilots to practice simulated approaches, landings, and takeoffs in all types of weather conditions.

## Earnings Reports

| GREYHOUND<br>COMPUTER CORP. |              |
|-----------------------------|--------------|
| 8 Months Ended Sept. 30     |              |
| 1968                        | 1967         |
| Revenue \$2,961,507         | \$18,870,773 |
| Earnings                    | 4,048,412    |
| Shr Ems                     | 2,867,762    |
|                             | 57           |

| A-M CORPORATION        |              |
|------------------------|--------------|
| 3 Months Ended Oct. 31 |              |
| 1968                   | 1967         |
| Revenue \$80,212,000   | \$84,133,000 |
| Earnings               | 2,249,000    |
| Shr Ems                | 3,588,000    |
|                        | 41           |

a—Subject to year and audit adjustment.

| DATRONIC RENTAL CORP.   |           |
|-------------------------|-----------|
| 3 Months Ended Sept. 30 |           |
| 1968                    | 1967      |
| Revenue \$882,171       | \$203,074 |
| Earnings                | 66,018    |
| Shr Ems                 | 41,883    |
|                         | 26        |

a—Provision for federal income taxes deferred.

| SANDERS ASSOCIATES, INC. |              |
|--------------------------|--------------|
| 3 Months Ended Oct. 31   |              |
| 1968                     | 1967         |
| Revenue \$43,490,000     | \$36,600,000 |
| Earnings                 | 1,035,000    |
| Shr Ems                  | 1,025,000    |
|                          | 30           |

a—Restated to include consolidation of Computer Leasing Co.

| BERGEN DRUG CO.      |              |
|----------------------|--------------|
| Year Ended Aug. 31   |              |
| 1968                 | 1967         |
| Revenue \$40,555,778 | \$37,580,846 |
| Earnings             | 1,043,069    |
| Shr Ems              | 750,221      |
|                      | 25           |

a—Restated to reflect acquisition.

b—Equal to 8.14 a share 1968 and 8.09 a share 1967. c—Based on net income from operations.

| CENTINENTAL COMPUTER<br>ASSOCIATES, INC. |             |
|------------------------------------------|-------------|
| Year Ended Sept. 30                      |             |
| 1968                                     | 1967        |
| Revenue \$3,351,060                      | \$2,186,231 |
| Earnings                                 | 772,820     |
| Shr Ems                                  | 158,800     |
|                                          | 18          |

| CYBER-TRONICS, INC.    |          |
|------------------------|----------|
| 8 Months Ended Oct. 31 |          |
| 1968                   | 1967     |
| Revenue \$21,799,816   | \$22,276 |
| Earnings               | 90,234   |
| Shr Ems                | 33,815   |
|                        | 6.04     |

a—Based on 1968 average shares outstanding and 1967 actual shares outstanding.

| COMPUTER LEASING CO.    |              |
|-------------------------|--------------|
| 8 Months Ended Sept. 30 |              |
| 1968                    | 1967         |
| Revenue \$40,555,000    | \$27,244,000 |
| Earnings                | 4,042,000    |
| Shr Ems                 | 1,610,000    |
|                         | 6.92         |

a—Restated to reflect acquisitions.

| UNIVERSITY COMPUTING CO. |              |
|--------------------------|--------------|
| 8 Months Ended Sept. 30  |              |
| 1968                     | 1967         |
| Revenue \$40,555,000     | \$27,244,000 |
| Earnings                 | 4,042,000    |
| Shr Ems                  | 1,610,000    |
|                          | 6.92         |

a—Restated to include consolidation of Computer Leasing Co.

| COMPUTING AND<br>SOFTWARE, INC. |              |
|---------------------------------|--------------|
| Year Ended Oct. 31              |              |
| 1968                            | 1967         |
| Revenue \$32,851,000            | \$27,945,000 |
| Earnings                        | 1,277,000    |
| Shr Ems                         | 1,311,000    |
|                                 | 1.35         |

a—Restated to include acquisitions.

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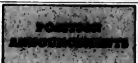
## ASE to Install Direct System For Odd Lots

NEW YORK—The American Stock Exchange will put into operation in 1969 a computerized message-switching system to transmit odd-lot orders directly from member brokerage house order rooms to trading posts on the floor.

Exchange President Ralph S. Saul said the exchange had decided to move ahead now with a direct-switching program to partially automate handling of odd-lot orders and to increase floor capacity for handling round-lot orders in anticipation of continued active markets in 1969.

Direct switching of odd lots is an interim step to exchange plans for a major expansion of automation operations over the next three to five years. A computer-communications system to process all odd-lot orders off the floor of the exchange, now in the design stage, is scheduled for the early 1970s when the exchange must be prepared for the possibility of the 20-million-share trading day.

Through direct switching, odd-lot orders would be received by wire from member-floor order rooms and switched directly to trading posts—rather than to booths of member firms. This would substantially increase the capacity of member and trading facilities on the floor to handle an increased flow of round-lot orders.



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